

NEW MINERAL NAMES*

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Alumotantite*, Natrotantite*

A. V. Voloshin, Yu. P. Men'shikov, and Ya. A. Pakhomovskii (1981) Alumotantite and natrotantite, new tantalum minerals in granitic pegmatites. *Zapiski Vses. Mineralog. Obsch.*, 110, 338-345 (in Russian).

Both minerals occur in albitized areas of granite pegmatites, Kola Peninsula, USSR. Alumotantite forms rims around crystals of simpsonite and also rims natrotantite. The latter occurs intergrown with microlite and rims simpsonite.

Microprobe analysis of alumotantite gave Ta₂O₅ 81.13, Nb₂O₃ 0.80, Al₂O₃ 18.47, sum 100.40%, corresponding to Al_{0.98}Ta_{0.99}Nb_{0.02}O₄, or AlTaO₄. X-ray study showed it to be orthorhombic, $a = 4.90 \pm 0.01$, $b = 11.58 \pm 0.02$, $c = 5.66 \pm 0.01$ Å. The strongest lines (59 given) are 5.66(5)(001), 3.64(7b)(101), 3.13(10)(121), 2.89(8)(040), 2.439(5)(200), 1.649(5)(070).

Alumotantite is colorless, transparent, luster adamantine. No cleavage. Birefringent and anisotropic. Reflectances: 486 nm, 15.6 and 14.7; 589 nm, 15.4 and 14.6; 656 nm, 15.9 and 15.1%. Microhardness at different loads: 20 g, 1840-2230; 40 g, 1950-2090; 100 g 1650-1690 kg/sq.mm. Strongly luminescent bright blue in cathode rays, not luminescent in ultra-violet.

Microprobe analysis of natrotantite gave Ta₂O₅ 91.26, Nb₂O₃ 2.71, Na₂O 4.69, CaO 0.08, PbO 0.87, sum 99.61%, corresponding to (Na_{1.04}Ca_{0.01}Pb_{0.03})(Ta_{2.84}Nb_{0.14})O₈, or NaTa₃O₈.

The X-ray pattern is indexed on monoclinic cell with $a = 10.819 \pm 0.02$, $b = 6.239 \pm 0.02$, $c = 12.781 \pm 0.02$ Å, space group C2/c. The strongest lines (60 given) are 3.06(7)(004), 3.02(10b)(021), 2.778(9b)(022), 1.556(8)(606), 1.548(8)(041). The pattern matches closely that given by J.C.P.D.S. for synthetic Na₂Ta₄O₁₁ (Reisman, *J. Phys. Chem.* v. 66, no. 1 (1962). Further study of the composition of the synthetic compound is needed.

Natrotantite is colorless, transparent, with a slight yellowish tint. Luster adamantine. Cleavage absent, fracture uneven. Strongly luminescent yellow-green in cathode rays, but not luminescent in UV. Strongly anisotropic and birefringent. Reflectances: 486 nm, 15.0, 13.6; 589 nm, 12.4, 11.8; 656 nm, 12.0, 12.0%. Microhardness: 20 g load, 1250; 40 g load 1270 kg/sq.mm.

The names are for the composition. Type material is at the Mineralogical Museum, Geological Institute, Kola Branch, Acad. Sci. USSR, Apatite. M.F.

Bartelkeite*

P. Keller, H. Hess, and P. J. Dunn (1981) Bartelkeite, PbFe⁺²Ge₃O₈, a new germanium mineral from Tsumeb, Namibia. *Chem. Erde* 40, 201-206 (in German).

*Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.

Electron microprobe analysis gave GeO₂ 53.7, PbO 34.0, FeO 12.1, sum 99.8%, corresponding to Pb_{0.97}Fe_{0.95}⁺²Ge_{3.02}O₈. The infra-red spectrum showed the absence of water, and microchemical tests showed the iron to be ferrous. Dissolved by hot HCl.

X-ray data showed the mineral to be monoclinic, space group P2₁ or P2₁/m, $a = 5.431$, $b = 13.689$, $c = 5.892$ Å, $\beta = 111.79^\circ$, $Z = 2$, D calc. = 4.97. The strongest X-ray lines (40 given) are 4.74(6)(110), 4.42(8)(111), 2.91(10)(041,041), 2.87(8)(121), 2.75(7)(141,002), 2.20(7)(222,230).

The mineral occurs in cavities in primary ore containing germanite, renierite, tennantite, and galena. One crystal is tabular on {101}, the other acicular on {101}. Other forms observed are {111} and {010}. Max. size 1.0 × 0.3 × 0.2 mm. Colorless to very pale greenish, cleavage {101} distinct. H about 4. Optically biaxial, negative, 2V ~ 35°, $ns \alpha = 1.885$, $\beta = 1.910$, $\gamma = 1.913$, $Z = b$, $r < v$.

The name is for Wolfgang Bartelke, mineral collector and specialist in Tsumeb minerals. Type material is at the University of Stuttgart and the Smithsonian Institution, Washington. M.F.

Cestibtantite*

A. V. Voloshin, Yu. P. Men'shikov, Ya. A. Pakhomovskii, and L. I. Polezhaeva (1981) Cestibtantite, (Cs,Na)SbTa₄O₁₂, a new mineral from granitic pegmatites. *Zapiski Vses. Mineralog. Obsch.* 110, 345-351 (in Russian).

Five microprobe analyses gave Ta₂O₅ 70.47-72.51, Nb₂O₃ 1.33-3.40, Sb₂O₃ 12.26-14.15, Bi₂O₃ 0.20-1.07, Cs₂O 6.88-8.33, Na₂O 0.88-1.60, CaO 0.04-0.24, PbO 1.06-3.52, sum 98.62-99.04%. Atomic absorption analysis showed Li₂O < 0.05%. The infra-red spectrum of the mineral indicates the presence of hydroxyl and the formula is calculated as (Cs_{0.57}Na_{0.48}Ca_{0.01})(Sb_{1.09}Bi_{0.04}Pb_{0.06})(Ta_{3.78}Nb_{0.22})O₁₂(OH)_{0.58}.

The X-ray pattern is indexed as cubic, $a = 10.256 \pm 0.005$ Å, G meas. 6.4-6.6, calc. G for CsSbTa₄O₁₂ = 6.67, for (Cs_{0.5}Na_{0.5})SbTa₄O₁₂ = 6.35. The strongest lines (49 given) are 3.17(9)(311), 3.04(10)(222), 2.024(8)(333,511), 1.840(10)(440), 1.587(10)(622), 1.474(8)(551,711), 1.370(9)(553,731), 1.074(8)(844), 1.017(9)(773,951), 1.012(10)(666,10.2.2). The mineral is isostructural with microlite.

Cestibtantite is colorless to gray, luster adamantine. Fracture uneven, brittle, microhardness (kg/sq.mm) 130-1200 (20g load), 800-1050 (40g load), 670-780 (100g load). Isotropic, $n > 1.8$. Coefficient of reflectance (%) 13.8, 480 nm, 13.6 at 551 nm, 13.6 at 589 nm, 13.0 at 656 nm. It shows orange-yellow luminescence in UV light, a weak yellowish glow in cathode rays.

The mineral occurs in intensely albitized zones of a granite pegmatite, Kola Peninsula, USSR, associated with simpsonite, stibiotantalite, microlite, wodginite, tantalite, and pollucite. It forms grains 0.1-3 mm long bordering stibiotantalite and simpsonite and along fractures in them.

The name is for the composition. Type material is at the Mineralogical Museum, Acad. Sci. USSR, Moscow, and the Geological Institute, Kola Branch, Apatite.

Discussion

The formula can be written, in better accord with the usual formulation of the Pyrochlore Group (62, 403–410 (1977) as $(\text{Cs,Na,Sb})(\text{Ta,Nb})_2(\text{O,OH})_7$. M.F.

Clinophosinaite*

A. P. Khomyakov, D. Yu. Pushcharovskii, and J. G. Ronsbo (1981) Clinophosinaite, $\text{Na}_3\text{CaPSiO}_7$, a new mineral. *Zapiski Vses. Mineralog. Obshch.* 110, 351–355 (in Russian).

Microprobe analyses (JGR) (each av. of 2) gave for samples from Koashva (K) and Yukspor (Y) respectively: P_2O_5 25.35, 25.5; SiO_2 20.1, 20.1; RE_2O_3 0.18, 0.44; CaO 15.65, 16.45; SrO 3.08, 1.91; MnO 0.60, 0.54; Na_2O 32.55, 32.7, K_2O 0.09, 0.05, sum 97.60, 97.69%. Traces of Ti, Fe, Mg, Al, Zr, and Ba were present. Water or hydroxyl may be present; the loss of weight to 1000° was 1.08% (Koashva), 2.55% (Yukspor). The mineral is decomposed by cold 10% HCl.

X-ray study showed the mineral to be monoclinic, space group $P2/c$, $a = 7.303$, $b = 12.201$, $c = 14.715\text{Å}$, $\beta = 91^\circ 56'$ (K), $a = 7.30$, $b = 12.21$, $c = 14.81\text{Å}$, $\beta \sim 92^\circ$ (Y); $Z = 8$. The strongest lines (28 given) are 2.724(100)(034,230), 2.639(57)(204), 2.550(50)(204), 2.031(50)(060), 1.823(47)(400).

The mineral is pale lilac, luster vitreous. Hardness 4, fracture conchoidal, $G = 2.88$, 2.85. Optically biaxial, positive ns $\alpha = 1.557$, $\beta = 1.561$, $\gamma = 1.567$, $2V = 80^\circ$ (K), $\alpha = 1.556$, $\beta = 1.559$, $\gamma = 1.563$, $2V = 75^\circ$ (Y).

The mineral occurs in dumps from Mt. Yukspor, Lovozero massif, and in drill cores from Mt. Koashva, Khibina massif. Both are in alkalic pegmatites, and occur intergrown with zirsinalite, which appears to be a replacement product of eudialyte.

The name is for the analogy in composition to phosinaite (60, 488(1975)); the latter contains 13–14% RE_2O_3 . Type material is at the Fersman Mineralogical Museum, Acad. Sci. USSR, Moscow. M.F.

Cobaltkoritnigite*

K. Schmetzer, W. Horn, and O. Medenbach (1981) Cobaltkoritnigite, $(\text{Co,Zn})[\text{H}_2\text{O}][\text{AsO}_3\text{OH}]$, a new mineral, and pitticite, $\text{Fe}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 9\text{--}10\text{H}_2\text{O}$, an amorphous Fe-arsenate-hydrate. *Neues Jahrb. Mineral., Monatsh.*, 257–266 (in German).

Microprobe analyses gave As_2O_5 54.63, 54.14; CoO 20.55, 23.46; NiO 0.25, 0.37; CuO 0.50, 0.41; ZnO 11.73, 9.09; FeO 0.45, 0.48%; H_2O not detd., corresponding to $(\text{Co}_{0.59}\text{Zn}_{0.31}\text{Cu}_{0.02}\text{Fe}_{0.01}\text{Ni}_{0.01})\text{As}_{1.02}$ and $(\text{Co}_{0.68}\text{Zn}_{0.24}\text{Cu}_{0.02}\text{Fe}_{0.01}\text{Ni}_{0.01})\text{As}_{1.02}$. From the agreement of the X-ray powder data with those of koritnigite, the formula is $(\text{Co,Zn})\text{AsO}_3(\text{OH}) \cdot \text{H}_2\text{O}$.

X-ray powder data are nearly identical with those for koritnigite and the same unit cell is derived—triclinic $a = 7.95$, $b = 15.83$, $c = 6.67\text{Å}$, $\alpha = 90.9^\circ$, $\beta = 96.6^\circ$, $\gamma = 90.0^\circ$. The strongest lines are 7.94(100)(020,100), 3.82(50)(210,210), 3.25(40)(221, 012,221), 3.23(40)(012), 3.14(70)(211,230,211,230), 2.461(40)(250, 250). The X-ray data agree less well with data for synthetic $\text{CoAsO}_3(\text{OH}) \cdot \text{H}_2\text{O}$.

The mineral occurs as intensely colored purple tabular crystals from an old sample from the Saxony Erzgebirge, formed by the alteration of glaucodot, and associated with sphaerocobaltite, erythrite, pitticite, and quartz. It also occurs as an alteration product of cobaltite from the Richelsdorf Mts. Luster vitreous. Cleavage {010} perfect, {100} good. Optically biaxial, positive, $2V = 78^\circ$, ns $\alpha = 1.646$, $\beta = 1.668$, $\gamma = 1.705$, strongly pleochroic with X deep violet, Y reddish-violet, Z bluish-violet, $X \wedge b = 3^\circ$, $Y \wedge a = 12.5^\circ$.

The name is for the composition and the relation to koritnigite. M.F.

Coutinite (= Lanthanite-(Nd))

Kenkichi Fujimori (1980) "Lanthanite" from Curitiba, a new lanthanum mineral *Anais Acad. Brasileira Ciencias*, 53, 147–152 (in Portuguese).

The name coutinite is given to the mineral of composition $(\text{Nd, La, Sm, Pr})_2(\text{CO}_3)_3 \cdot n\text{H}_2\text{O}$ from Curitiba, Parana, Brazil, described by Roberts *et al.*, (1980) (abs. in *Am. Mineral.* 66, 637–638 (1981) as lanthanite-(Nd), a name approved before publication by the IMA Commission on New Mineral Names. The X-ray powder data, agreeing well with the data of Roberts *et al.*, correspond to a different orientation, space group $Pccn$, $a = 10.01$, $b = 9.50$, $c = 17.04\text{Å}$.

Discussion

The name lanthanite-(Nd) has priority. M.F.

Duhamelite*

S. A. Williams (1981) Duhamelite, $\text{Cu}_4\text{Pb}_2\text{Bi}(\text{VO}_4)_4(\text{OH})_3 \cdot 8\text{H}_2\text{O}$, a new Arizona mineral. *Mineral. Mag.* 44, 151–152.

The average of 3 chemical analyses performed on 1318, 322 and 869 μg gave CuO 20.4, PbO 28.4, Bi_2O_3 15.9, V_2O_5 23.1, H_2O 11.8, total 99.6%, in close agreement with the formula given in the title. Duhamelite occurs with chrysocolla, malachite, and rare fornacite, wulfenite, and bismutite in quartz veins cutting Precambrian greenstones in an area 5 km southwest of Payson, Arizona, where some gold mining was carried on a hundred years ago. The small, green, crystals of duhamelite, no longer than 0.4 mm or 0.02 mm in width, may be free-standing or compacted into barrel-shaped bundles. The streak is pale yellow-green, the crystals are brittle and the estimated Mohs hardness is 3. Specific gravity determined by Berman balance is 5.80 ± 0.05 . Duhamelite is orthorhombic with $a = 7.49$, $b = 9.66$, and $c = 5.87\text{Å}$. The strongest lines of the powder diffraction pattern are 5.014(4)(011), 3.493(5)(210), 3.159(7)(201), 2.950(10)(130), and 2.642(9)(012). The prism axis, taken as [001], is coincident with γ . Indices of refraction are $\alpha(\text{np}) = 2.08$, $\beta = 2.11$ for NaD light. Pleochroism in yellows is weak with $X = Y < Z$. Duhamelite is soluble in cold dilute HCl or HNO_3 , not in water. It fuses readily to a syrupy black slag. The name is for J. E. DuHamel, geologist for Phelps Dodge Corporation, the finder of the mineral. A.P.

Fe-tychite

Yu. A. Malinovskii, S. V. Baturin, and N. V. Belov (1979) Crystal structure of Fe-tychite. *Doklady Akad. Nauk SSSR* 249, 1365–1368 (in Russian).

Material found by A. P. Khomyakov in alkaline rocks of the Kola Peninsula was analyzed by microprobe by S. M. Sandomirskaya, giving SO_3 14.00, CO_2 30.89, FeO 15.26, MnO 4.35, MgO 2.77, Na_2O 32.30, sum 99.75%, corresponding to $\text{Na}_6(\text{Fe}_{1.24}\text{Mn}_{0.36}\text{Mg}_{0.40})(\text{SO}_4)(\text{CO}_3)_4$. Cubic, space group $Fd\bar{3}$, $a = 13.962\text{\AA}$, $Z = 8$, G calc. = 2.78, meas. 2.7. No other data are given. M.F.

Giuseppettite*

F. Mazzi and C. Tadani (1981) Giuseppettite, a new mineral from Sacrofano (Italy), related to the cancrinite group. Neues Jahrb. Mineral. Monatsh., no. 3, 103–110.

Electron microprobe analysis gave SiO_2 33.25, Al_2O_3 28.56, Fe_2O_3 0.03, CaO 4.85, Na_2O 14.37, K_2O 8.00, SO_3 9.92, Cl 0.78, sum 99.76–($\text{O}=\text{Cl}_2$) 0.18 = 99.58%. The empirical formula expressed in terms of the general cancrinite formula is $(\text{Na}_{5.0}\text{K}_{1.8}\text{Ca}_{1.0})(\text{Al}_{6.05}\text{Si}_{5.95})\text{O}_{24}(\text{SO}_4)_{1.8}\text{Cl}_{0.25}$. Infrared analysis confirmed the absence of H_2O , OH and CO_3 groups. Strong absorption maxima were observed at 995 cm^{-1} ($\text{Si}-\text{O}-\text{Si}$) and 1100 cm^{-1} ($\text{Si}-\text{O}-\text{Si}$ and SO_4).

X-ray study showed the mineral to be hexagonal, preferred space group $P6_3mc$, $a = 12.850(1)$, $c = 42.22(3)\text{\AA}$, D meas. 2.35, calc. 2.365, $z = 8$. The strongest powder lines (69 given) are 3.712(100)(300), 3.446(80)(217), 3.126(70)(219), 2.141(66)(330), 6.42(62)(110), 2.640(62)(405, 0.0.16).

The mineral occurs in fragmented, pale violet-blue veinlets a few millimeters thick in an ejected sanidinite block at Sacrofano, Latium, Italy. Optically uniaxial, positive, $\epsilon = 1.507$, $\omega = 1.491$, H 6–7. No cleavage.

The name is for Professor Giuseppe Guiseppetti of the University of Pavia. Type material is preserved at the Mineralogical Museum, University of Pavia. C.A.F.

Lammerite*

P. Keller, W. H. Paar, and P. J. Dunn (1981) Lammerite, $\text{Cu}_3[\text{AsO}_4]_2$, a new mineral from Laurani, Bolivia. Tschermarks Min. Petrog. Mitt. 28, 157–164 (in German).

Electron microprobe analysis gave CuO 49.9, ZnO 0.8, MgO 0.2, FeO 0.2, As_2O_5 49.8, total 100.9% leading to the ideal formula $\text{Cu}_3[\text{AsO}_4]_2$. The absence of water or hydroxy ions was established by IR spectroscopy.

X-ray study shows the mineral to be monoclinic, diffraction symbol $P2_1/*$, with $a = 5.080(2)$, $b = 11.616(6)$, $c = 5.391(2)\text{\AA}$, $\beta = 111.71(3)^\circ$; $Z = 2$, D meas. 5.18, calc. 5.26. Strongest lines of the X-ray powder pattern (29 indexed lines given) are 3.80(6)(021), 3.06(8)(031), 3.00(8)(130), 2.89(10)(040, 131), 2.84(7)(111), 2.62(8)(121), 2.59(8)(112), 2.52(9)(201, 041).

The mineral occurs as dark green spheroidal aggregates ca. 0.5 cm in diameter implanted on a corroded quartzose rock and associated with olivenite and a new blue arsenate yet to be described. The spheroidal aggregates of lammerite have a radial structure in which idiomorphic crystals are ca. 0.5 mm in length. There is good cleavage on $\{010\}$, and poorer cleavage on $\{100\}$ and possibly $\{001\}$; Mohs hardness is $3\frac{1}{2}$ –4. Luster on cleavage surfaces is vitreous but on crystal faces adamantine; the streak is light green. The mineral is biaxial positive, $2V = 54(5)^\circ$, $\alpha = 1.89$, $\beta = 1.90$, $\gamma = 1.95$ (Na); $r \gg v$ strong; pleochroism:— X light

blue, Y sky blue, Z bluish green; $X||b$, $Z \perp c = 40^\circ$ in the obtuse angle β .

The mineral was found in a single specimen collected long ago by Franz Lammer of Leoben, Austria, for whom the mineral is named, and labelled only as being from Laurani, Bolivia. A.P.

Lazarenkoite*

L. K. Yakhontova and I. I. Plosina (1981) The new mineral lazarenkoite Mineralog. Zhurnal, 3, no. 3, 92–96 (in Russian).

A preliminary report on "unnamed calcium-iron arsenite" is in 52, 300 (1967). The mineral was found, associated with annabergrite, as fibrous orange crystal incrustations formed by oxidation of skutterudite-loellingite ores of a deposit in W. Siberia.

Analyses showed (average of 2 complete, 2 partial) As_2O_3 61.5, Fe_2O_3 16.7, FeO 5.6, MgO 0.7, CaO 5.1, H_2O^\pm 12.2, sum 101.8%, corresponding to $(\text{Ca}_{0.44}\text{Fe}_{0.38}^{+2}\text{Mg}_{0.09})\text{Fe}_{1.02}^{+3}\text{As}_{3.04}^{+3}\text{O}_{7.00} \cdot 3.32\text{H}_2\text{O}$, or $(\text{Ca}, \text{Fe}^{+2})\text{Fe}^{+3}\text{As}_3^{+3}\text{O}_7 \cdot 3\text{H}_2\text{O}$. Infra-red study showed the absence of arsenate (AsO_4) $^{-3}$ and arsenite (AsO_3) $^{-3}$. The DTA curve shows an endothermic effect at 160° (loss of water) and exothermic effects at 460° , 510° , and 610° . All the water is lost at 140°C ; further heating decomposes the mineral at 350° , when it gives off white fumes with the characteristic odor of As_2O_3 . The IR spectrum has bands corresponding to molecular water, but no bands corresponding to arsenate or arsenite ions. Insoluble in H_2O , dissolved by cold dilute HCl. Single crystal study was unsuccessful. The X-ray pattern (21 lines) was indexed on an orthorhombic cell with $a = 21.80$, $b = 12.64$, $c = 8.40\text{\AA}$, $Z = 10$, G calc. 3.59, meas. 3.45 ± 0.05 . The strongest lines are 11.20(9)(110, 200), 8.40(10)(001), 6.55(8)(111, 201), 4.66(9)(401, 221).

Color bright orange, luster resinous to silky, $H = 1$. Optically biaxial, negative, $ns \alpha = 1.820$, $\beta = 1.920$, $\gamma = 1.955$ (all $\pm .003$), $2V$ about 30° , elongation positive, pleochroism strong, with X pale yellow, Y pale brown, Z rose-brown.

The name is for mineralogist E. K. Lazarenko, academician of the Acad. Sci. Ukraine SSR. Type material is at the Mineralogical Museum, Acad. Sci. USSR. M.F.

Mbobomkulite*, Hydrombobomkulite*, Nickelalumite

J. E. J. Martini (1980) Mbobomkulite, hydrombobomkulite, and nickelalumite, new minerals from Mboobo Mkuulu cave, eastern Transvaal. Annals Geol. Survey S. Africa 14, no. 2, 1–110.

The minerals occur in the Mboobo Mkuulu cave (the big hole), Nelspruit district, eastern Transvaal, as sky-blue, friable nodules in a matrix of powdery allophane. Nickelalumite, associated with chalcoalumite also occurs as thin, pale-blue coatings on gypsum crystals that form a crust on the ceiling.

Mbobomkulite

Analysis by H. H. Lochmann of pale blue nodules, dried in a silica gel desiccator, gave Al_2O_3 39.42, NiO 7.98, CuO 4.28, SO_3 3.81, N_2O_5 15.23, H_2O 27.90, SiO_2 1.91, C 0.26, F 0.07 = 100.86 – ($\text{O} = \text{F}_2$) 0.03 = 100.83% (C , N_2O_5 , and H_2O by gas chromatography). After deduction of SiO_2 , Al_2O_3 , and H_2O as allophane, this gives the formula $(\text{Ni}_{0.57}\text{Cu}_{0.29})\text{Al}_{3.93}(\text{NO}_3)_{1.50}(\text{SO}_4)_{0.25}(\text{OH})_{11.45}\text{F}_{0.02} \cdot 1.59\text{H}_2\text{O}$. When the mineral is

removed from the desiccator, it takes up about 5% of moisture, which would give $3\text{H}_2\text{O}$ in the formula.

The X-ray pattern is very close to that of chalcocalumite and the formula is therefore $(\text{Ni,Cu})\text{Al}_4(\text{NO}_3)_{1.5}(\text{SO}_4)_{0.25}(\text{OH})_{12} \cdot 3\text{H}_2\text{O}$. The strongest lines (41 given) are 8.550(100)(002), 7.870(15)(011), 4.549(15)(202), 4.271(40)(004), 3.179(15)(015,222), 3.054(15)(311), 2.512(15)(133), 2.004(15)(235). Indexed on the chalcocalumite structure, this corresponds to a monoclinic cell with $a = 10.171$, $b = 8.865$, $c = 17.145 \text{ \AA}$, $\beta = 95.37^\circ$, $Z = 4$, G calc. 2.344, measured by sink-float 2.30.

The mineral is powdery, sky-blue. Under the microscope colorless, pseudo-hexagonal plates about $10 \mu\text{m}$ across. Birefringent, $n_s \alpha = 1.515$, $\gamma = 1.585$, sign, and $2V$ could not be determined. Cleavage $\{001\}$ perfect. $X' \angle c = 10^\circ$.

Hydrombomkulite

Freshly collected blue nodules give a different X-ray pattern. On exposure to the atmosphere, this loses water and is transformed into mbomkulite in a few hours. The loss in a desiccator was 32.1%, so its formula should be the same as for mbomkulite, but with 13–14 (perhaps 12–15) H_2O . The dehydration is irreversible. A DTA curve showed poorly resolved endothermic peaks at 60–100°C (loss wt. 32%) and at 160°C (5% loss), a strong endothermic peak at 280°C (loss 24%), and a small endothermic peak at 800°C (loss 3%).

The strongest X-ray lines (42 given) are at 10.45(100)(002), 5.229(50)(004), 3.485(30)(006), 2.489(15)(260,254,411). The indexing was on a cell with $a = 10.145$, $b = 17.155$, $c = 20.870 \text{ \AA}$, $\beta = 90.55^\circ$.

Nickelalumite

Analysis of a nodule containing allophane and opal gave Al_2O_3 39.30, NiO 6.59, CuO 2.35, SO_3 10.28, N_2O_5 4.70, $C < 0.30$, H_2O 28.53, SiO_2 8.95, sum 100.70%. Microprobe analysis of a crust on gypsum gave Al_2O_3 41.65, NiO 10.08, Cu 0.93, SO_3 13.53, N_2O_5 not detectable. These indicate a formula $(\text{Ni}_{0.75}\text{Cu}_{0.25})\text{Al}_4(\text{SO}_4)_{0.75}(\text{NO}_3)_{0.5}(\text{OH})_{12} \cdot 3\text{H}_2\text{O}$, the nickel analogue of chalcocalumite. The X-ray pattern (27 lines) has strongest lines 8.543(100)(002), 7.877(20)(011), 4.267(10)(004), 2.507(15)(133), 2.289(15)(126,305), 1.997(20)(235). This is calculated to a monoclinic cell, $a = 10.175$, $b = 8.860$, $c = 17.174 \text{ \AA}$, $\beta = 95.95^\circ$, $Z = 4$, G calc. 2.28, measured by sink-float 2.24 $n_s \alpha = 1.532$, $\gamma = 1.543$, $X' \angle c$ about 30° .

Mbomkulite is the nickel nitrate analogue and nickelalumite the nickel sulfate analogue of chalcocalumite. Type material is at the museum of the Geological Survey of South Africa, Pretoria. M.F.

Preisingerite*

D. Bedlivy and K. Mereiter (1981) Preisingerite, a new bismuth mineral from Argentina. *Fortschr. Mineral.* 59, Beih. 1, 15–16 (in German) (abs).

The mineral occurs with rooseveltite in the deposits of San Francisco de los Andes and Cerro Negro de la Aguadita, Calingasta Dept., San Juan Province, as white to gray rounded tablets up to 0.2 mm in size. Analysis gave the formula $\text{Bi}_3(\text{AsO}_4)_2\text{O}(\text{OH})$, with a small amount of P replacing As. Triclinic $P\bar{1}$, $a = 9.453$, $b = 7.404$, $c = 6.937 \text{ \AA}$, $\alpha = 92.18$, $\beta = 106.67$, $\gamma = 110.62^\circ$, $Z = 2$, G calc. 7.24. Optically biaxial, $2V \sim 90^\circ$, $n_s \alpha = 2.130$, $\beta = 2.16$, $\gamma = 2.195$. M.F.

Unnamed Ag-Au-As-S-Se Minerals

C. R. Moore (1979) Geology and mineralization of the former Broken Hills gold mine, Hikua, Coromandel, New Zealand. *New Zealand J. Geol. Geophys.*, 22, 339–351.

Electron microprobe analyses are given of 3 minerals:

(1) Four analyses gave (range and average): Au 2.8–15.6, 9.7; Ag 56.6–76.0, 65.0; Se 10.3–14.8, 12.0; Fe 0.1–0.3, 0.2; Cd 0.2–0.3, 0.3; Cu 0–0.1; As 1.0–7.1, 4.1; S 8.2–9.0, 8.4%. The average gives $\text{Ag}_{12.29}\text{Au}_{1.0}\text{As}_{1.12}\text{Se}_{3.1}\text{S}_{5.35}$. The mineral occurs intergrown with electrum and rarely with agularite.

(2) Two analyses gave Au 6.1, 3.4; Ag 66.5, 71.2; Cd 0.2, 0.3; As 8.1, 5.7; S 13.1, 12.6; Se 5.3, 5.3; the average gives $\text{Ag}_{9.53}\text{Au}_{0.36}\text{As}_{1.38}\text{Se}_{1.0}\text{S}_{6.03}$. Beaded or tabular grains.

(3) Analysis gave Au 14.7, Ag 59.8, Fe 0.2, Cd 0.2, Cu 0.5, As 5.0, S 12.6, Se 5.3, sum 99.0%, corresponding to $\text{Ag}_{8.39}\text{Au}_{1.14}\text{As}_{1.0}\text{Se}_{1.1}\text{S}_{6.06}$. Pinkish-red, porous material. M.F.

Unnamed Alloys (α -brass, β -brass, Mg_2Si , Al_2CuMg)

A. . Okrugin, V. V. Oleinikov, N. V. Zayakina, and N. V. Leskova (1981) Native metals in traps of the Siberian Platform. *Zapiski Vses. Mineralog. Obsh.*, 110, 186–204 (in Russian).

This paper summarizes work of these authors; they have previously published descriptions of native Al (65,205(1980)) and native Cd. The present paper adds those listed above, with X-ray data and microprobe analyses of these phases, all separated from diabases.

Discussion

Several of the materials mentioned, especially native Al, are thermodynamically unstable phases in material high in iron oxides. In addition, some of the associations (chromian pyrope in diabase, essentially pure native Zn and Cd in the same rock, and others) are extremely unlikely. It is not surprising, therefore, that V. S. Sobolev, (*Zapiski Vses. Mineral. Obsh.* 108, 691–695 (1979)) pointed out the likelihood that these results are due to contamination of the samples. The authors reject this on the grounds that the samples were collected from sparsely inhabited localities and that great care was taken in the laboratory.

In my opinion the results cannot be accepted unless the authors (1) publish their procedures in detail (grinding, sieving, and separations), (2) publish reports on samples in section in the rocks.

Note—Translations of the two papers cited will be furnished on request. M.F.

Unnamed $\text{K}_2\text{ZrSi}_3\text{O}_9 \cdot \text{H}_2\text{O}$

G. D. Ilyushin, Z. V. Pudovkina, A. A. Voronkov, A. P. Khomyakov, V. V. Ilyukhin, and Yu. A. Pyatenko (1981) Crystal structure of a new natural modification of $\text{K}_2\text{ZrSi}_3\text{O}_9 \cdot \text{H}_2\text{O}$. *Doklady Akad. Nauk SSSR* 257, 608–610 (in Russian).

The mineral was found in the Khibina alkalic massif, Kola Peninsula, intergrown with another potassium zirconium silicate. Colorless to yellowish crystals, flattened on (010), cleavages (100) and (010) perfect. H 5, G 2.99. Optically biaxial, negative, $2V = 80^\circ$, $n_s \alpha = 1.596$, $\beta = 1.610$, $\gamma = 1.619$, $X = c$, $Y = b$. The

mineral is readily decomposed by acids. When heated to 900°C, it is transformed into wadeite.

The mineral is orthorhombic, space group $P2_12_12_1$, $a = 10.208$, $b = 13.241$, $c = 7.174\text{\AA}$. The strongest X-ray lines (not indexed) are 8.12(15), 6.64(100), 4.06(15), 3.31(15), 3.02(20), 2.15(15).

Discussion

It is to be regretted that the crystallographic description is published before the mineral is fully described and named. M.F.

Unnamed $\text{Na}_5\text{Zr}_2\text{Si}_6\text{O}_{18}\text{Cl} \cdot 2\text{H}_2\text{O}$

A. P. Khomyakov, T. A. Kurova, N. G. Shumyatskaya, A. A. Voronkov, and Yu. A. Pyatenko (1981) A new natural zirconosilicate, $\text{Na}_5\text{Zr}_2[\text{Si}_6\text{O}_{18}]\text{Cl} \cdot 2\text{H}_2\text{O}$ and its crystal structure. Doklady Akad. Nauk SSSR 257, 622–624 (in Russian).

The mineral occurs in the Khibina alkalic massif, Kola Peninsula, intergrown with elpidite and fluorite. The mineral is monoclinic, space group $C2/m$, Cm , or $C2$, most probably $C2/m$, $a = 10.785 \pm 0.003$, $b = 14.492 \pm 0.003$, $c = 6.627 \pm 0.002\text{\AA}$, $\beta = 113.12 \pm 0.02^\circ$, $Z = 2$, G calc. 2.88, meas. 2.9. Strongest lines not stated. Hardness 5. Optically biaxial, positive, $2V = 33^\circ$, $ns \alpha = 1.597$, $\beta = 1.599$, $\gamma = 1.632$, $X = b$, $Z \angle c = 50^\circ$. Cleavages $\{110\}$ and $\{010\}$ perfect, $\{100\}$ and $\{121\}$ less so.

This may be identical to an unnamed mineral from St. Hilaire, Quebec, described by Chao and Baker, Mineralog. Record. 10, p. 99 (1979). M.F.

Unnamed palladium bismuth chloride

A. M. Karpenkov, N. S. Rudashevskii and N. I. Shumskaya (1981) A natural chloride of palladium and bismuth—the phase of composition $\text{Pd}_4\text{Bi}_3\text{Cl}_3$. Zapiski Vses. Mineralog. Obsh., 110, 86–91 (in Russian).

Average of 3 separate microprobe analyses (using metals and synthetic chlorapatite) gave Pd 24.5, Pt 2.07, Fe 0.78, Ni 0.27, Bi 64.1, Cl 6.43, sum 98.15 and a formula of $(\text{Pd}_{3.81}\text{Pt}_{0.18}\text{Fe}_{0.24}\text{Ni}_{0.06})_{\Sigma=4.29}\text{Bi}_{5.07}\text{Cl}_{3.00}$ for an empirical formula of $\text{Pd}_4\text{Bi}_3\text{Cl}_3$. The mineral occurs as very small rounded to anhedral inclusions, not larger than $30 \times 30 \mu\text{m}$ in cross-section, in a matrix of insizwaitegeversite and paolovite. This occurrence is in the massive pyrrhotite ores of the Oktyabr Cu–Ni deposit also containing chalcopyrite, pentlandite, and magnetite. Minor and rare minerals are hingerite (Cl-bearing), sphalerite, pyrite, marcasite, argentopentlandite, cubanite, mackinawite, galena, native silver electrum, and other platinum-group minerals. The unnamed mineral is strongly birefractant, from dark gray to nearly white with a rose tint. It has an extremely fine fibrous structure and appears gray with a shagreen surface in sections perpendicular to the fibers. It has a relatively low reflectance which increases uniformly towards the red end of the spectrum. The mineral is strongly anisotropic, with color effects, from near extinction to yellowish, which are at maximum in oil immersion. The mineral qualitatively resembles a fine-grained aggregate of valleriite. One distinct, fracture-free micro-indentation gave $\text{VHN}_{20} = 114$.

Discussion

A probable new mineral species requiring X-ray data for confirmation. The discovery is important as it is the first of a

chloride-bearing platinum-group mineral. Also this is the first confirmation of insizwaite in the Noril'sk-Talnakh area. L.J.C.

Four Unnamed Minerals

Henryk Kucha (1979) (publ. 1980) $\text{Fe}^{+2}\text{Th}(\text{PO}_4)_2$, monoclinic; $\text{Fe}^{+2}\text{Th}(\text{PO}_4)_2 \cdot \text{H}_2\text{O}$, hexagonal; $\text{Fe}_{1-x}^{+2}\text{Th}_x(\text{RE}, \text{Fe}^{+3})_{2x}(\text{PO}_4)_2 \cdot 1-3\text{H}_2\text{O}$, orthorhombic; and $\text{Fe}_3^{+2}(\text{H}_2\text{O})(\text{PO}_4)_2$, monoclinic;—four new minerals from Poland. Mineral. Polonica, 10, no. 1, 1–29 (in English).

Three samples from pegmatites and hydrothermal veins in the Luzyce granitic rocks, Lower Silesia, were studied by electron microprobe analyses, DTA, TGA, X-ray, and infra-red analyses. The samples are considered to be mixtures of 4 new phases labelled U-1 to U-4; no explanation is given as to how the compositions of the phases were deduced from the analyses, which show great variations. U-1 is red-brown to red-orange. X-ray powder data indicate it to be related to monazite, monoclinic, $P2_1/n$, with $a = 6.68$, $b = 6.97$, $c = 6.41\text{\AA}$, $\beta = 103.88^\circ$, $Z = 4$ $(\text{Th}, \text{Fe}^{+2}, \text{Ca}, \text{Fe}^{+3}, \text{RE})(\text{PO}_4, \text{SiO}_4 \cdot \text{OH})$.

U-2 is white to yellow with green or red-orange tinge. Probably hexagonal, $a = 7.04$, $c = 6.36\text{\AA}$, related to rhabdophane and brockite, perhaps $Z = 3$ $(\text{Th}, \text{Fe}, \text{Ca}, \text{RE})(\text{PO}_4, \text{SiO}_4, \text{CO}_3) \cdot 0.5\text{H}_2\text{O}$.

U-3 is reddish-brown, orthorhombic, $a = 6.77$, $b = 12.06$, $c = 6.41\text{\AA}$, probably $P222$, related to ningyosite, $Z = 3$. $(\text{Fe}_{1-x}^{+2}\text{Th}_x - \text{RE}, \text{Fe}^{+3})_{2x}(\text{PO}_4)_2 \cdot 1-3\text{H}_2\text{O}$.

U-4 gives an X-ray pattern close to that of synthetic $\text{Fe}_3^{+2}(\text{H}_2\text{O})(\text{PO}_4)_2$ of Moore and Arahi, Am. Mineral. 60, 454–459 (1975). It is monoclinic, $a = 9.32$, $b = 10.04$, $c = 7.96\text{\AA}$, $\beta = 117.18^\circ$, $Z = 4$. The strongest lines are 3.34(8)(012), 2.68(9)(321) (coincides with goethite line), 2.44(6)(320) (coincides with monazite group).

Discussion

Requires further study. M.F.

NEW DATA

Asbolan

F. V. Chukhrov, A. I. Gorshkov, I. V. Vitovskaya, V. A. Drits, A. V. Sivtsov, and E. S. Rudnitskaya (1980) Crystallochemical nature of Co–Ni asbolan. Izvest. Akad. Nauk SSR, Ser. Geol., 6, 73–81.

F. V. Chukhrov, A. I. Gorshkov, I. V. Vitovskaya, V. A. Drits, A. I. Sivtsov, and Yu. P. Dikov (1980) Crystallochemical nature of Ni asbolan. Izvest. Akad. Nauk SSR, Ser. Geol., 9, 108–120.

A hybrid structure has been derived for asbolans from several localities in the USSR, including a sample from weathered crust of the Lipov deposit, Middle Urals. Platelets with irregular surfaces ranging in diameter from sub-micron to several microns wide are coated with films of goethite. X-ray energy dispersive microanalyses of these platelets, corrected for FeOOH impurities, yielded the empirical formula $(\text{Ni}_{0.28}\text{Co}_{0.12}\text{Ca}_{0.05})\text{Mn}(\text{OH})_2\text{O}_{1.5} \cdot 0.64\text{H}_2\text{O}$, X-ray diffraction patterns showed lines at 9.6(w)(001), 4.82(s)(002), 2.445(mw)(100), 1.7(vw)(104), and

1.419(vw)(110), giving hexagonal cell parameters $a = 2.823$, $c = 9.6\text{\AA}$. Electron diffraction patterns, however, indicated two hexagonal sublattices: I with $a_0 = 2.823$, $c_0 = 9.34\text{\AA}$; and II with $a = 3.04$, $c = 9.34\text{\AA}$. Collapse of (001) reflections to 9.34 (001), 4.677 (002), and 3.11 \AA (003) is attributed to dehydration in the vacuum of the electron microscope. Asbolan is deduced to have a hybrid layer structure analogous to valleriite and related lithiophorite, and is formulated as $[\text{Mn}^{4+}\text{O}_{2-x}(\text{OH})_x]_1^{2+} [\text{R}^{2+}_{1-y}(\text{OH})_{2-2y+x}]_1^{-} \cdot n\text{H}_2\text{O}$, where R^{2+} denotes Co^{2+} , Ni^{2+} , Ca^{2+} , and y and x are both < 1 . Defects leading to the islet character of sublattice II result from different dimensions of the divalent cations in this layer relative to the Mn^{4+} ions in sublattice I. The structural model proposed for asbolan shows water molecules bound to Ca^{2+} ions adjacent to islets of Co^{2+} and Ni^{2+} ions octahedrally coordinated to OH^- ions. Loss of this molecular water in the temperature range 150–300°C results in X-ray amorphous products, while interlayer water between sublattice I and II lost under vacuum causes contraction of (001) planes in electron diffraction patterns. Thermogravimetric and infrared spectral measurements support the H_2O and OH^- species proposed in the structural model. R.G.B.

Combeite

R. Fisher and E. Tillmanns (1981) The crystal structure of combeite, a cyclosilicate with six rings. *Fortschr. Mineral.* 59, Beih. 1, 45–46 (abs.) (in German).

A new microprobe analysis by K. Abraham gave the formula $\text{Na}_{2.18}\text{Ca}_{1.88}\text{Si}_3\text{O}_9$, or $\text{Na}_2\text{Ca}_2\text{Si}_3\text{O}_9$. The mineral is trigonal, space group $P3_221$ or $P3_121$, $a = 10.480$, $c = 13.188\text{\AA}$. M.F.

Machatschkiite

H. Effenberger, K. Mereiter, and J. Zemann (1981) The crystal structure of machatschkiite. *Fortschr. Mineral.* 59, Beih. 1, 41–42 (abs.) (in German).

Structural study showed the mineral to be trigonal, space group $R3c$. The formula given $[\text{Ca}_3(\text{AsO}_4)_2 \cdot 9\text{H}_2\text{O}]$ (62, 1260 (1977)) is not possible; it might be $\text{Ca}_6(\text{AsO}_4)_2(\text{AsO}_3\text{OH})_2(\text{SO}_4) \cdot 15\text{H}_2\text{O}$, or $\text{Ca}_6(\text{AsO}_4)(\text{AsOH})_3(\text{PO}_4) \cdot 15\text{H}_2\text{O}$. There is insufficient material for a new analysis. M.F.

Surinamite

E. M. F. DeRoever, D. Lattard, and W. Schreyer (1981) Surinamite: a beryllium-bearing mineral. *Contrib. Mineral. Petrol.* 76, 472–473.

Ion probe analysis showed several per cent Be in surinamite and wet chemical analysis of a surinamite-kyanite mixture gave BeO 0.6%, which, assuming all Be to be in the surinamite, gave BeO 4–5%. The formula of surinamite is probably $(\text{Mg}_{2.25}\text{Fe}_{0.75})(\text{Al}_{3.75}\text{Fe}_{0.25})\text{BeSi}_3\text{O}_{16}$.

Hydrothermal syntheses in the system $\text{MgO}-\text{Al}_2\text{O}_3-\text{SiO}_2-\text{H}_2\text{O}$ failed to produce surinamite; with addition of BeO, however, surinamite was synthesized at 800°C, 20 kbar. M.F.

Tunisite

H. Effenberger, F. Kluger, F. Pertlik, and J. Zemann (1981) Tunisit: Kristallstruktur und Revision der chemischen Formel. *Tschermaks Mineralog. Petrog. Mitt.*, 28, 65–77.

Neutron-activation analysis of a 4.7 mg sample of tunisite from the type locality (*Am. Min.* 54, 1–13, 1969) leads to a slight revision of the formula which is now given as $\text{NaCa}_2\text{Al}_4(\text{CO}_3)_4(\text{OH})_8\text{Cl}$, the presence of chlorine not having been recognized originally. Determination of the structure and its refinement using better material from France (*Schweiz. Min. & Pet. Mitt.*, 59, 223–238, 1979), analysis of which had also shown the presence of chlorine, confirmed the space group, $P4/nmm$, and cell content, $Z = 2$, initially reported. Cell dimensions found for the tunisite from France, $a = 11.983(11)$, $c = 6.5637(7)\text{\AA}$, are very close to those reported for the type material. A.P.